Exemption No. 7508

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
RENTON, WASHINGTON 98055-4056

In the matter of the petition of

Bombardier Aerospace, Inc.

for an exemption from § 25.1435(b)(1) of Title 14, Code of Federal Regulations.

Regulatory Docket No. FAA-2001-9034

PARTIAL GRANT OF EXEMPTION

By letter of February 13, 2001, Mr. K. A. Barnett, Airworthiness Manager, Bombardier Aerospace, Inc., P.O. Box 6087, Station Centre-ville, Montreal, Quebec H3C 3G9, Canada, petitioned for exemption from the static pressure test requirements of § 25.1435(b)(1) of Title 14, Code of Federal Aviation Regulations (14 CFR). The proposed exemption, if granted, would permit certification compliance for the Bombardier Continental Business Jet Model BD-100-1A10 airplanes by allowing the complete hydraulic system to be functionally tested on the airplane over the range of motion of all associated user systems at the system relief pressure setting of 3,400 psid.

The petitioner requests relief from the following regulation:

Paragraph (b)(1) of Section 25.1435, "Hydraulic Systems," requires: "A complete hydraulic system must be static tested to show that it can withstand 1.5 times the design operating pressure without a deformation of any part of the system that would prevent it from performing its intended function. Clearance between structural members and hydraulic system elements must be adequate, and there must be no permanent detrimental deformation. For the purpose of this test, the pressure relief valve may be made inoperable to permit application of the required pressure."

Related Section of 14 CFR:

Paragraph (a)(2) of Section 25.1435 requires: "Each element of the hydraulic system must be able to withstand, without rupture, the design operating pressure loads multiplied

by a factor of 1.5, in combination with ultimate structural loads that can reasonably occur simultaneously. Design operating pressure is maximum normal operating pressure, excluding transient pressure."

The petitioner provides the following supportive information:

"Reference: Docket 28617 published in Federal Register / Volume 61, No 129 / Pages 35055-35062 / July 3, 1996 / Proposed Rule and Notice 96-6.

"Technical Information in Support of the Exemption

"Bombardier Aerospace requests an exemption for FAR 25.1435(b)(1), based on the referenced NPRM and the precedent set by the granting of an Exemption under similar circumstances for the Bombardier Global Express BD700-1A10, Exemption 6726 (Docket 29077). In addition, a similar request for exemption was granted for the Bombardier Regional Jet model CL-600-2C10, Exemption 6893 (Docket 29466)

"Bombardier's position is derived from the discussion of the reference Proposed Rule and Notice, for FAR 25.1435(c)(3) - Hydraulics Systems Tests - which states that:

> *'The complete hydraulic systems must be functionally tested on the airplane in normal operation over the range of motion of all associated user systems. The test must be conducted at the system relief pressure or 1.25 times the design operating pressure if a system pressure relief device is not part of the system design. Clearance between hydraulic system elements and other systems or structural elements must remain adequate and there must be no detrimental effects.'*

"In the reference Proposed Rule and Notice, the FAA proposes to replace the current FAR 25.1435(b)(1) with the proposed FAR 25.1435(c)(3) requirement. The proposed rule would revise the current airplane static proof pressure test requirements to require a complete functional (dynamic) airplane test at a lower pressure. Specifically the proposed rule requires that the complete hydraulic system must be functionally tested on the airplane over the range of motion of all associated user systems at the system relief pressure or 1.25 times the design operating pressure if a system pressure relief device is not part of the system design.

"As part of Bombardier testing to demonstrate compliance with FAR 25.1309(b), Bombardier will conduct a dynamic test equivalent to the proposed FAR 25.1435(c)(3) to demonstrate systems operations following hydraulic pump compensator failure. The BD-100-1A10 hydraulic system design operating and the relief valve cracking pressures are 3000 and 3400 psi, respectively. A dynamic test will be conducted at 3400 psid which is equal to the system relief valve cracking pressure. Bombardier will use the new proposed Advisory Circular (AC) 25.1435-1 to ensure consistent interpretation and application of the proposed revised standard.

"Bombardier Aerospace shares the FAA's opinion, expressed in the referenced NPRM, that the proposed functional test more closely approximates actual operating conditions in which higher system pressures would be seen than in the existing static test. This is because for the static test, several parts of the system and associated relief valves, including return lines, may need to be disabled to allow the system pressurization at 1.5 times the design operating pressure because the relief valves are designed to open at a pressure lower than 1.5 times the design operating pressure.

"BD-100-1A10 hydraulic system components, lines and installations are individually tested to 1.5 times the design operating pressure as part of qualification tests and aircraft functional test procedures to satisfy the current FAR 25.1435(a)(2) requirement. However, a single test of the complete hydraulic system is not planned, as this requires extensive test preparation and creates an unnecessary financial burden without adding to the level of safety.

"Summary

"Based on the detail provided in the petition, Bombardier formally requests an Exemption from the requirements of FAR 25.1435(b)(1). As outlined above, Bombardier will conduct individual component testing in conjunction with the dynamic test for the BD-100-1A10. It is Bombardier's position that testing currently stipulated by FAR 25.1435(b)(1) is of no additional value and that the proposed method of demonstrating compliance will provide a safe and reliable product."

Notice and public procedure has been provided as follows:

On March 19, 2001, the FAA published a summary of the petition in the Federal Register (66 FR 15520) and requested comments on it from the public. No comments were submitted in response to the notice.

The FAA's analysis and summary of this petition is as follows:

The FAA has carefully considered the information provided by the petitioner and has determined that there is sufficient merit to warrant a grant of exemption, with the following two provisions:

1. Hydraulic system components, lines, and installations are individually tested to 1.5 times the design operating pressure as part of qualification tests.
2. The complete hydraulic system is functionally tested on the airplane over the range of motion of all associated user systems at the system relief pressure setting of 3,400 psid. The test at this pressure must demonstrate adequate clearance between hydraulic system elements and other systems or structural elements with no detrimental effects.

In consideration of the foregoing, I find that a grant of exemption is in the public interest. Therefore, pursuant to the authority contained in 49 U.S.C. §§ 40113 and 44701, delegated to me by the Administrator, Bombardier Aerospace, Inc., is hereby granted an exemption from the static testing requirements of 14 CFR § 25.1435(b)(1) to the extent

necessary to permit type certification of the Model BD-100-1A10 by conducting applicable testing specified in accordance with the two provisions described above.

All test results pertinent to this exemption must be documented in a report and a copy provided to this office at the following address:

Federal Aviation Administration
Transport Airplane Directorate
Attention: Mahinder Wahi, ANM-112
Propulsion and Mechanical Systems Branch
1601 Lind Avenue S.W.
Renton, WA 98055-4056
U.S. A.

Issued in Renton Washington, on April 18, 2001.

Original signed by:

D. L. Riggin, Acting Manager
Transport Airplane Directorate
Aircraft Certification Service